When alternative layer stackings cause commensurate structures to co-exist, the interpretation of the diffraction data need not be unique.

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Refinements of crystal structures with commensurate stacking faults should recognize that the structure is not everywhere the same and the structure can change coherently from one structure to another across an interface between adjacent layers. Assumptions are commonly used to constrain a refinement by placing the structure in a particular category consistent with the capabilities of a particular program. However this categorization can restrict the success of a refinement. The first assumption is that the options for a layer can be constructed using a symmetry operation commensurate with the crystal lattice and either a single reference layer or a single commensurately modulated structure. The second is that a clear distinction can be made between twinning and disorder. The twinning concept can include allo twins, ie the diffraction pattern has independent twinning and disorder. The twinning concept can include second is that a clear distinction can be made between the Cu atoms, in the structure. type of dimer layers, showing the same distance between magnetic compound of high current interest with only one spin dynamics of field-induced order states in this model structure, the incommensurately modulated structure content (±δ). A detailed understanding of the crystal compounds shows a variation of the imbedded oxygen paramagnetic regime from the ordered state [3, 4]. The investigation of the proportions of oxygen in the compounds shows a variation of the imbedded oxygen content (±δ). A detailed understanding of the crystal structure, the incommensurately modulated structure depending on the oxygen content will enable studying the spin dynamics of field-induced order states in this model magnetic compound of high current interest with only one type of dimer layers, showing the same distance between the Cu atoms, in the structure.


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Complete decoupling of magnetic order and superconductivity in a conventional superconductor

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Conflicting electron states at the Fermi surface usually prevent a harmonic coexistence of superconductivity and magnetism in conventional superconductors. In order to improve the understanding of the interaction between superconductivity and magnetism a model material with missing competition between the two phenomena is required. In Pr$_2$Pt$_3$Ge$_5$ we discovered a system, in which multiple magnetic orders and superconductivity not only coexist, but do not compete [1]. The systems displays a relatively high transition temperature $T_c = 7.8$ K and two antiferromagnetic transitions $T_{N1} = 3.4$ and $T_{N2} = 4.1$ K with a commensurate and an incommensurate canted structure [1, 2]. We studied the superconducting and magnetic properties of the compound by means of neutron diffraction, magnetization and transport measurements. The interpenetrating HT-phase diagrams, representing the refined magnetic structures, preclude any direct competition between the superconducting and magnetic phases. We propose that different sheets of the Fermi surface are involved in the magnetic and superconducting exchange interactions.

Reference:

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